

# Performance of Motor of Players of the Male Young Category of Aquatic Pole of the City of São Paulo



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## Abstract

The present study aims to identify the basic physical qualities of athletes of the male juvenile category of water polo in the city of São Paulo, drawing a motor profile of this category. Make a comparison between the clubs and the category profile, then compare them to each other and compare the performance of these teams in the Brazilian championship. As methodology we used the field research, where we performed physical tests and body measurements of each athlete. Four clubs from the city of São Paulo participated in the study. The test period occurred 40 (forty) days after the start of the Brazilian championship. The physical capacities measured in this research were strength abdominal and upper limb strength and the power strength of athletes' lower limbs. The results showed that the teams are very close to the average of the category, we observed that team A was well above the average of the other teams. We conclude with the obtained data that, the technicians or the physical trainers of each team will have a better parameter of the characteristics physical characteristics of their athletes and of the category which can favor the use of strategies and adequate planning for the training, aiming at obtaining the best results.

**Keywords:** Aquatic pole; Training; Performance

## Introduction

The Water Polo was initially created as a form of leisure and today is considered a professional sport. The modality has modified its rules in recent years to draw more attention from the public. These changes have required more talented athletes, consequently more up-to-date professionals, seeking training strategies to improve the physical and tactical qualities of the team.

The possibility of knowing the individual characteristics favors the use of strategies and adequate planning, so that, respecting the biological individuality, better results can be obtained. Many studies were and still are developed with the purpose of finishing the physical profile of the elite athletes of different sports modalities. Based on information that a mapping of the physical structures (representatives of peculiar advantages of each sport) brings to coaches and physical trainers parameters of the typology of athletes champions.

When analyzing a collective sport it is seen that its own evolution took each tactical position of the players to a specialization to better perform its function, thus, the movement of the players within the game differs by position, supposedly leading to the choice of athletes with better physical characteristics to perform of the function [1].

This is the great motivation of this work, to be able to use the research in benefit of the practice with scientific bases, favoring a progress of the water polo in our country. To get a high-level

job, you must also know the genetic potential of each individual. We know that some variables such as height, weight, muscle strength, speed and power seem to be highly dependent on the genetic constitution, and since sporting success does not depend on a single variable, it is necessary to evaluate a group to include a battery of tests with high coefficients of validity, productivity and objectivity, and, whenever possible, have normative tables available.

In this sense, in Brazil, there are already studies on the application of methods of sports assessment that allow to identify basic physical qualities and help in sports orientation. The choice for this theme is justified by the existence of few studies with the water polo in the national territory, lack of information, related to physical quality with athletes of the base category. Thus favoring a better working methodology for technicians and use as a parameter for future research.

The general objective of the study is to identify the basic physical qualities of athletes of the male category of water polo in the city of São Paulo, drawing a motor profile of this category. Make a comparison between the clubs and the category profile, then compare them to each other and compare the performance of these teams in the Brazilian championship. The test period occurred 40 (forty) days after the start of the Brazilian championship, which was held from June 6 to 10 The physical capacities measured in this research were strength abdominal and upper limb strength and the power strength of athletes' lower limbs.

### Literature Review

#### The water polo mode

The Water Polo is a game of intelligence, speed and endurance. A lot of skill in handling ball and excellent swimming, are attributes of the most importance for a fast game of passes in movement. According to the regulations in FAP [2], the playing area is 30x20 meters for men and 25x17 for women, with a depth of at least 2 meters.

Each team has 13 players: seven starters and six reserves. Players should float all the time and can not lean on the edges or any other marking, except the goalkeeper, no other player can touch the ball with both hands at the same time.

The game has four times (quarters) each with eight minutes of effective play with two minutes of rest between the first and second quarter, the third and fourth/fourth, between the second and third quarter there is a five minute interval. After the Atlanta games, the new rules allow replacements of any player at any time. Each team can ask for "time" twice during the game. Technical time that lasts for five minutes can be requested as long as the team requests possession of the ball [3].

Physical contact is permanent as players maneuver looking for the best position in front of the opponent's goal. The referee indicates the fouls whistling and indicating with the arms the favored team, but also indicating with specific gestures the type of fault committed. The goal is scored when the ball is kicked or driven inside the opposing goal, crossing completely the goal line.

As in basketball, also at the pole, two clocks control the time, one indicates the actual playing time, marking the remaining time of the room. The second clock indicates the time the attacking team has to kick the opponent's goal: 30 seconds of effective play. At the beginning of each game room players line up in the lines betting the goal. At the referee's signal the teams swiftly swim towards the opponent's field. The team that has a player coming in first to rent the ball, placed equidistant from the goal lines, has possession of the ball for the first attack.

### Evaluation Methods

#### Force

A precise definition of strength, taking into account its physical and psychic aspects, presents a great difficulty, since the type of force, the muscular work, the different characteristics of the muscular tenacity are influenced by many factors. Fleck and Kraemer (1999) describe muscle strength as the maximum amount of force that the muscle can generate in a specific pattern of movement and at a given speed of movement.

Force and its various manifestations can always be considered under the aspects of general force and specific force. The general force is the force of all muscle groups independent of a sport. Specific force, however, is the force employed in a given sporting modality. According to Verkhoshanski (2001), to determine the type of force, it is necessary to measure the contraction

force of the skeletal muscles, which are related by at least four physiological factors: Cent Central Nerves-which organize the existing influences on motor neurons and regulate the order of muscle development at work and their coordination.

**Peripherals:** which determine the functional current state of muscles, as well as their oxidative, elastic and contraction capacities.

**Energies:** which ensure the mechanical effect of contracted muscles.

**Hormones:** which regulate a need for effective energetic supply of muscle contraction and which activate the synthesis of protein structures and the development of plastic processes.

#### Methods of evaluation of the force

According to Weineck among the types of tests are well-known laboratory tests, field tests, general tests specific tests for a sporting modality. These tests can be classified as dynamic and static [4].

**Static tests:** These tests reduce intermuscular influence, so that maximum strength depends on the number, thickness, length, and responsiveness of muscle fibers.

**Dynamic testing:** The influence of intramuscular coordination is increased due to the complexity and speed of movement execution. This test takes into account the balance between agonists and antagonists, from which the movement results.

**Power strength:** The explosive force in the conditions of the sport activity is manifested in the isometric and dynamic muscular work regimes.

Verkhoshanski (2001, p171) states: The explosive effort contains three components and in quantity is determined by the capabilities of the neuromuscular apparatus such as maximal muscle strength, the ability to manifest external effort at the onset of muscular useful tension, and the ability to increase muscular effort and the ability to increase muscle during the acceleration of the mass to be detached (force/ acceleration).

The development of an ability to manifest the explosive effort depends on all the capabilities of the aforementioned neuromuscular apparatus. The power strength is directly related to performance in various sports, so the need for the technical commission to measure such ability. Different tests are suitable for evaluating different forces. As this research aimed to verify the explosive force, a specific test was used for power strength. The test used was the Horizontal Jump proposed by Gaya e Silva [5], where the athlete places himself behind a line, with the feet parallel and slightly apart. At signal the athlete jumps as far as possible.

#### Measure of Height

Second [5] Stature, also known as height, is an indicator of body development and bone length.

### Procedure

The evaluator stands on the right side of the assessor, if necessary climb on a bench to carry out the measurement; the evaluated in orthostatic position, barefoot and united, looking for contact with measuring instrument the posterior surfaces of the heel, pelvic waist, scapular waist and occipital region, with the head oriented in the Frankfurt plane. The cursor or squares, at a 90 degree angle to the scale, touches the highest point of the head at the end of an inspiration, where the reading in meters.

### Material used

Stadiometer or tape measure affixed to a flat wall without skirting and square.

### Measurement of span

For the span test, we follow the traditional protocol, from a tape measure on a smooth wall and the assessed is measured from the tip of the right middle finger to the tip of the left middle finger. This will be standing, with arms in abduction of 90 degrees with the trunk, the elbows must be extended and the forearms in supination [6].

### Abdominal Strength Test

As an indicator of muscle strength/endurance, the modified abdominal test (ABD) was used, and the maximum number of repetitions performed Correctly for one minute was recorded [7]. Lying on your back (supine position) on a mattress on a flat surface with arms and legs extended, with the arms above the head. From this position the athlete lifts the trunk in tune with the recoil and flexion of the legs, the heels will be directed to the hip, and the elbows should pass the knee joint.

Upper limb test (flexion) In the arm flexion test, you should position yourself in the prone position using your own body weight with intensity, being a free exercise. To start the exercise place your hands on the ground with your fingertips facing forward, with a distance of 10 to 20 centimeters from the shoulder line, place the tip of the feet to the ground, with the legs extended keeping the spine erect and the abdomen slightly contracted, the face should allow adequate alignment between the trunk and the legs, making the extension movement and elbow flexion looking down, the movement should be complete arriving with the chest as close to the ground as possible and during the time of 1 minute make as many repetitions as possible, the test for the female is changed only by the knee support to the ground instead of the tip of the feet.

### Materials used

mattress and timer Speed test the application of this test was based on the proposal of the test of 15 meters for sprinter swimmers made by Fomitchenko (1996) cited by Brito and Figueiredo. And it was adapted according to the material and structure of the training site. An important factor in the choice of adapting this test is the absence of outputs and turns, powerful variables that could distort the final results [8].

In this way, the athletes would stand to perform the test below the marking flag of the 5 meters aligned by the position of the head, with the body behind the marking in suspension, but without moving. At the first beep, the swimmers started the effort, at the maximum possible speed and with the most efficient gestural frequency. The chronometer was triggered in the swimmers' reaction, so that the reflex level of the swimmers did not interfere with the sample [4].

### Material used

5 cones to mark the partial and a stopwatch. Vertical jump test for this test the jump with counter movement (SCM) was used. In this technique, the subject left the upright position with his hands at his waist and performed a preparatory knee flexion before jumping vertically. The degree of flexion in the preparatory movement was not controlled to avoid changes in the coordinate pattern of the jump of the subjects [8].

The jumps were performed on a contact platform (Elite Jump), which measures the height of the jump in centimeters. After the general heating the subjects performed a specific heating composed of a series of five repetitions of submaximal vertical jumps separated by 15 seconds. Two minutes after the specific warm-up, the athletes made five jumps, on the force platform, with interval of 15 seconds between each jump. Before the start of the jumps the subjects were instructed to jump as high as possible on the platform looking for to maintain the same corporal position during the phases of takeoff and landing. The highest value was used for the statistical calculation [9].

### Methodology

This research proposes the description of the data obtained and not its probabilities. The sample consisted of 30 male athletes aged between 14 and 15 years. Participants of the 3 big clubs of the capital of São Paulo and 1 of Santos, that are in final phase of preparation for the Brazilian championship. The athletes underwent motor performance tests and some tests were suggested by the Brazilian Sport Project (PROESP-BR) and by Carnaval, 2002. The measurements needed for the present study were obtained using the following instruments: Metric metal tape, measuring 3mt in length and 1mm precision, to measure the height, the wingspan, to measure the strength of the lower limbs was used the force platform ( ELITE JUMP); Technos YP2151 digital stopwatch. Statistical analysis was performed using a simple mean and standard deviation formula.

**Table 1:** Motor performance of the male juvenile category of water polo.

	Height	Wingspan	Flexion	Jump	Abdominal
Average	1,70	1,74	44,7	33,983	36,57
DP	0,04	0,05	7,16	5,48	1,22

Table 1 presents the descriptive data regarding the motor performance of the juvenile category of Water Polo. The lack of information may not be a sufficiently relevant reason for a research, but in this case, a strong reason may be the usefulness of these data to identify the athletes in the category average above

or below it. The importance of these data to the development of a more adequate training that explores the qualities and develops the weaknesses.

**Table 2:** Height.

<b>Height</b>	1,75	1,70	1,66	1,70
<b>DP</b>	0,02	0,01	0,00	0,04
	A	B	C	General

In Table 2 and in Graph 1, the athletes' height of each club was verified and it was compared with the general profile of the category. The athletes of team A, had a well above average result. Teams B, C had a similar result. But as the standard deviation is 0.09cm, there was no team that had a significant difference in

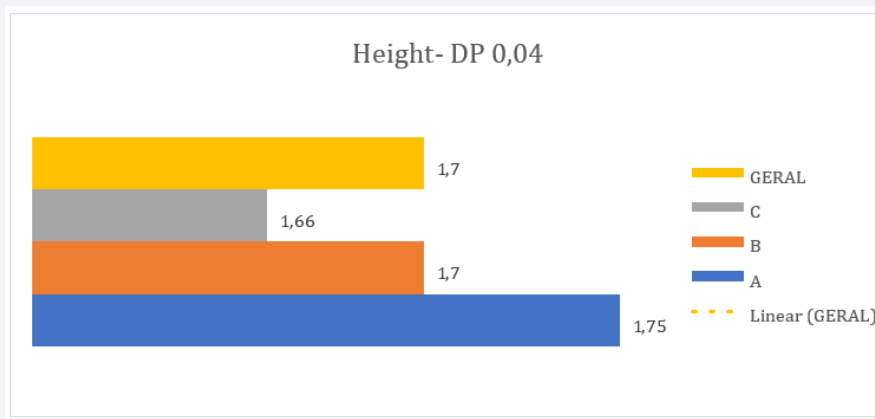
relation to the population mean, however there was a significant difference when comparing the team A with the teams B, C. Table 3&4 and Graph 2 &3 show the height of the athletes.

**Table 3:** Wingspan.

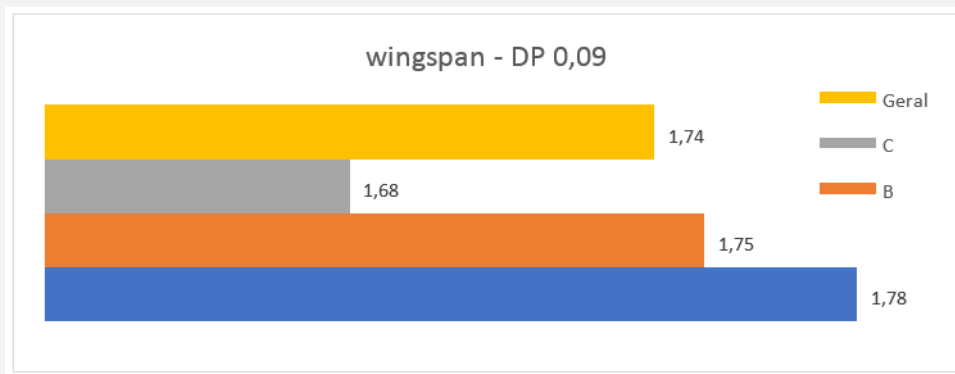
<b>Wingspan</b>	1,78	1,75	1,68	1,74
<b>DP</b>	0,07	0,06	0,09	0,09
	A	B	C	General

**Table 4:** Strength of upper limb resistance.

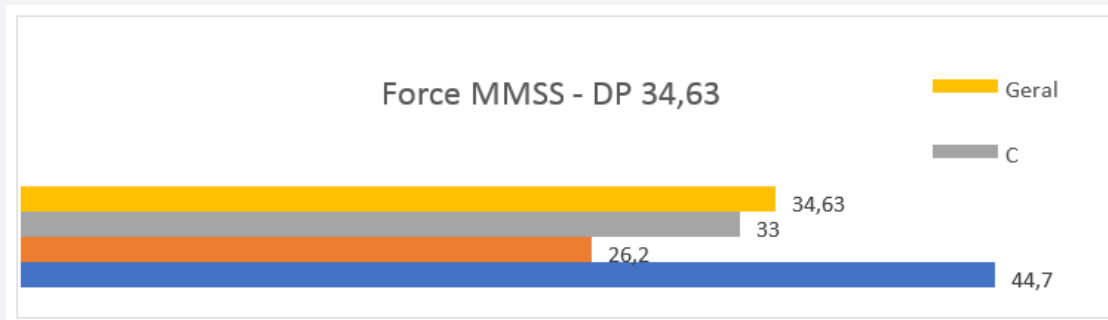
<b>Average</b>	44,7	26,2	33	34,63
<b>DP</b>	8,04	7,81	14,02	7,64
	A	B	C	General



**Graph 1:** The "A" team is above the population average, while the "C" team is below average. And even when compared among them, with standard deviation 0.4 centimeters, no team had a significant prominence.



**Graph 2:** Wingspan.



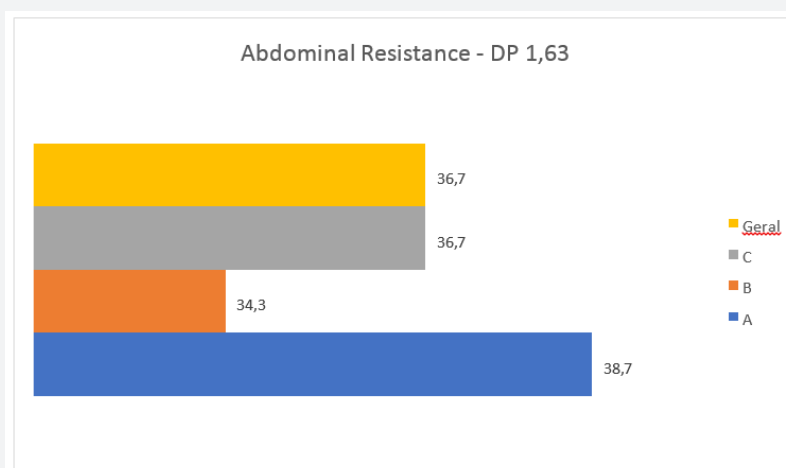
**Graph 3:** Strength of resistance of upper limbs.

The athletes of team B and team C are below the category average, only team A remained above average. As the standard deviation is 34.63 plays per minute, there is not a significant difference between the clubs and the category average. But there is a significant difference between Club A and the others. In Table 5 and in Graph 4, the strength of abdominal resistance of the athletes of each club was verified and it was compared with the profile of the category. It has been found that team A, with a performance slightly above the category average. Team C, is yielding very close

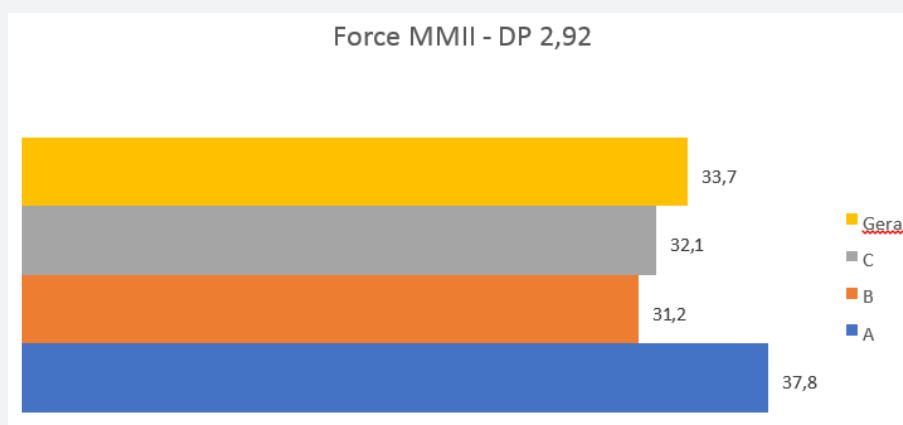
to the category average. Team B, on the other hand, has a slightly lower income than the category average. When compared to each other, no team had a significant income over the other.

Table 5: Strength of abdominal resistance.

Average	38,70	34,30	36,7	36,70
DP	6,08	4,47	7,03	1,63
	A	B	C	General



Graph 4: Strength of abdominal resistance.



Graph 5: Lower limb power strength.

In Table 6 and in Graph 5, the power of the inferior members of the athletes of each club was verified and it was compared with the profile of the category. The athletes of teams B and C, are below the average of the category, since the team A is well above the average, however as deviation is of 2.92 only the team A had a significant difference, above the standard deviation of the teams.

Table 6: Strength power of the lower limbs.

Average	37,8	31,2	32,1	33,7
DP	4,06	6,50	6,07	2,92
	A	B	C	General

Conclusion

Many studies were and are developed with the purpose of determining the physical profile of elite athletes of different sports

modalities. Based on information that a mapping of physical structures brings to coaches and physical trainers, parameters of the typology of champions athletes, aid in the training strategy. When analyzing a collective sport one sees that its own evolution took each sport a specialization, for the best performance in the modality. With the objective of identifying the motor performance of athletes of the juvenile category of Water Polo in the city of São Paulo, through the basic physical qualities of an athlete, and thus determine a profile of the category in this modality.

The following conclusion has been reached. With the capture of the data it was noticed that the teams are very close to the average of the category. However, the A team, when compared between the clubs, is well above the average of the other teams. Teams B and C are very similar in motor performance, being

able to be differentiated in the performance of the swimming and performance in the game. This differentiation was very clear in the performance that the teams obtained in the Brazilian championship of 2018. Where the team B, was in the third position, followed by the team C, in the fourth position. Showing so they are two very similar teams, differing in the details of the game. Team A, was championship champion, thus demonstrating their superiority to the other teams, thus winning their second consecutive Brazilian title in the category.

It is important to emphasize that tests are not a parameter to hunt talents, because the aerobic and anaerobic capacity in swimming was not measured. The technical and tactical ability of athletes and the game situation. With this data, the coaches or coaches of each team will have a parameter of the basic physical characteristics of their athletes and the category. Favoring the use of strategies and adequate planning for the training, aiming to obtain the best results.

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